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Data on the distribution of freshwater crayfish (Decapoda: Astacidae) in Hungary in the late 1950s

By

M. THURÁNSZKY and L. FORRÓ

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ABSTRACT. Based on a survey made by the late Z. THURÁNSZKY and on the material of the Hungarian Natural History Museum, the distribution data of the three native crayfish species (A. astacus, A. leptodactylus, A. torrentium) are presented.

KEY WORDS: Astacus astacus, A. leptodactylus, A. torrentium, Orconectes limosus distribution, Hungary

The freshwater crayfishes were well-known members of the Hungarian fauna about a hundred years ago, when they could be found in nearly all standing and flowing waters. Crayfish always served as a delicacy in the Hungarian cuisine and its export was of great importance. There had been several famous "crayfish waters" and the specimens were easily sold in foreign markets. However, this situation has drastically changed, to catch crayfish today is a difficult task, consequently, its export has sharply declined.

Besides economic importance, crayfish plays - with its animal and vegetable matter consumption - a significant role in the aquatic trophic system. It belongs to one of the most neglected animal groups in Hungary, since neither experiments nor tests have been carried out with it for a long time. The last comprehensive revision of the species composition, and the distribution of the Hungarian crayfish fauna were published by ENTZ (1909, 1914). Although his principal aim was to give a survey of the crayfish species native in Hungary, the distribution of the populations can also be conceived on the basis of his work. He mentioned such large water bodies as the River Danube, the Lake Balaton, etc. which were teeming with crayfish. According to ENTZ (1909, 1914) Hungary has three native Astacus species: A. astacus (Linnaeus, 1758), A. leptodactylus (Eschscholz, 1823), and A. torrentium (Schrank, 1803). The most wide-spread species is A. astacus. The species of A. leptodactylus is frequent in the waters of the plains, however, only the former one is of economic importance. Following the above-mentioned papers only a few regional studies have been published in Hungarian.

Besides the much debated, but not exactly known ravages of the crayfish plague, which were also mentioned by ENTZ (1909, 1914), the drastical changes in the natural environment (pollution, regulation, canalization, dredging) unfavourably influenced freshwater crayfish population of Hungary, too. With respect to the crayfish fungus (Aphanomyces astaci Schikora, 1903) and environmental conditions A. astacus is the most sensitive species, though the other two are not resistant to the crayfish plague either. Owing to the above-mentioned facts no reliable information is available on the distribution of these species and their native stocks. The occurrence of Orconectes limosus (Rafinesque, 1817) in the Danube at Budapest, further complicates the situation. It is very likely, that this species - which is resistant to the crayfish plague, and otherwise also is less sensitive to the environmental effects - worsens the prospects of survival of our native species.

This paper publishes the results of the investigations concerning the freshwater crayfish populations carried out by Dr. Z. THURÁNSZKY between 1956 and 1960. The crayfish material of the Hungarian Natural History Museum collected in 1910-1960 is also included to

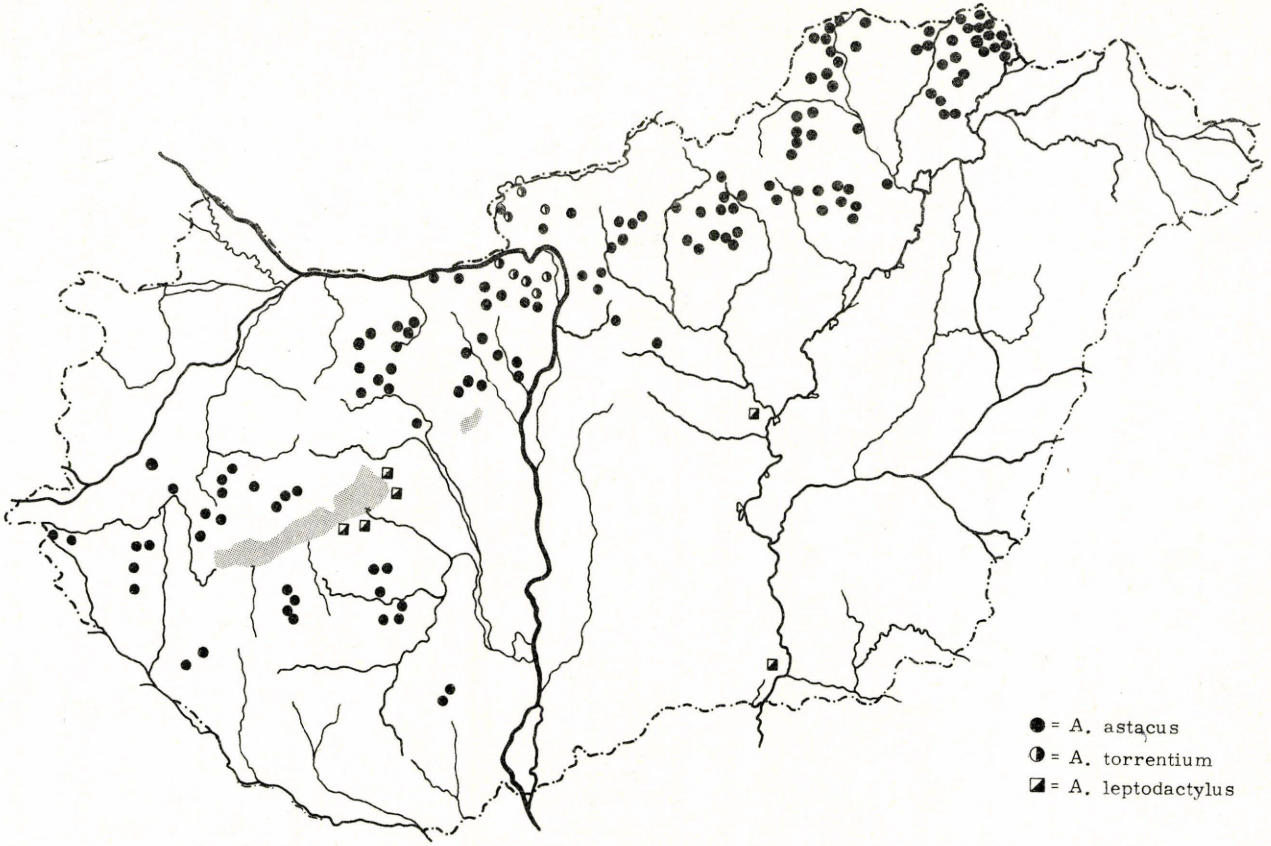

Fig. 1 Map of Hungary, showing the distribution of three Astacus species, based on the data listed in the present paper

complete the results. The late Dr. Z. THURÁNSZKY (father of the first author) surveyed the waters of Hungary in the mountain range to estimate the A. astacus populations and their possible exploitation. In the course of his comprehensive investigations he made the following records:

- name of the water and of the neighbouring village
- the place of the source and mouth; length of the water (km), attitude a. s. l.,
- description of the bed,
- water temperature,
- water output,
- name of inflowing streams,
- permanent pollution of water,
- description of the vegetation, and fishstock,
- crayfish consuming animals,
- description of crayfish stock,
- expectable catch per year,
- possibility of introduction.

614 streams and ponds were surveyed, 451 had no crayfish. Astacus astacus was found at 136 localities: A. torrentium at 6 and A. leptodactylus at 18. It should be noted, however, that the data concerning the latter species cannot be considered complete because this survey did not include water bodies of the plains where A. leptodactylus had been most frequent previously. Hence, these data will not be listed here. Fig. 1 shows the localities where crayfishes were found in the course of this survey. Of the numerous data mentioned above, the localities will be listed according to species. In the list the name of the villages and their UTM codes are given. We deem it necessary to give also some additional information: x indicates those sites, whose water analysis is also available; "r" indicates localities which were regulated at the time of collecting.

LIST OF LOCALITIES

A. Data of THURÁNSZKY's observations

Astacus astacus

Balaton-Zala catchment area: Baktüttös XM 37/1, XM 47/4 r; Sárhida XM 47/2, XM 37/4, XM 38/4, XM 48/3 x; Csatár XM 47/4, XM 48/1, XM 46/2, XM 36/3; Csipkerek XN 41/1, XN 42/4 - Zalabér XN 50/1 x; Inke XM 64/2, XM 63/3, XM 73/4, XM 74/4; Iharosberény XM 63/1, XM 53/4, XM 54/4, XM 64/4 x; Inke - Pat XM 64/1 x; Zalaszántó XM 69/1, XM 79/4; Várvölgy XM 79/1 x; Karmacs XM 68/2, XM 69/3 r; Öreglak YM 06/2, XM 96/3 - Osztopán YM 05/1 x; Somogyvár YM 06/1, XM 95/4, XM 96/4, YM 05/4; Pamuk YM 05/1, XM 95/4, YM 06/4; Pankasz XM 18/1 - Őriszentpéter XM 08/1, XM 09/4, XM 18/4, XM 19/4 Zala x; Nagyvázsony YN 00/1, XN 91/4, YN 01/4 x; Vigándpetend XN 90/2, YN 00/3 - Kapolcs XN 90/1 x.

Lake Velence catchment area: Lovasberény CT 14/1, CT 13/4.

Danube-Rába catchment area: Nyirád XN 80/1, XN 70/4, XN 81/4, XN 91/4 - Sümeg XN 70/1, XM 79/4, XM 89/4, XN 80/4 Marcal x; Nemeshany XN 71/2, XN 81/3; Kigyós patak; Csabrendek XN 70/2, XN 71/3, XN 80/3 x.

Danube-Süttői stream catchment area: Bajót CT 18/2, CT 19/3, CT 28/4, CT 29/4 x; Süttő CT 09/1, CT 08/1, CT 18/4, CT 19/4 x.

Pilis Mts. catchment area: Pilisborosjenő CT 47/1, CT 57/4.

Danube-Benta catchment area: Sóskut CT 35/1, CT 34/4 - Tárnok CT 34/1, CT 35/4; Herceghalom CT 36/4, Etyek CT 35/2, CT 25/3, CT 26/4, CT 36/4; Bicske CT 26/2, CT 16/3, CT 17/4, CT 25/4.

Danube-Által stream catchment area: Környe BT 96/2, BT 97/3, CT 06/3, CT 07/3; Kömlőd BT 96/2, BT 86/4, BT 87/4, BT 97/3 x; Kecskéd BT 96/1 r; Bokod BT 96/1, BT 86/4, BT 95/4 x.

Danube-Concó catchment area: Ácsteszér BT 75/1, YN 25/4, - Kisbér BT 76/1, BT 75/4, BT 86/4 x; Ete BT 86/2, BT 76/3, BT 77/4, BT 87/4 r.

Danube-Öreg-árok catchment area: Uny CT 37/2, CT 27/3, CT 28/4, CT 38/3 - Sárisáp CT 28/1, CT 27/4 x; Máriahalom CT 27/1, CT 37/4 r, x.

Danube-Szentlászló-viz catchment area: Bicske CT 26/2, CT 16/3, CT 17/4, CT 25/4; Felcsut CT 15/2, CT 16/3, CT 25/4, CT 26/4,- Vál CT 24/1, CT 25/4, r; Vértesacsa CT 14/2, CT 15/3, CT 25/4.

Danube-Sió catchment area: Váralja CS 02/1, BS 92/4, CS 03/4; Óbánya CS 02/1, BS 91/4, BS 92/4, CS 01/4; Balinka BT 84/1,

BT 74/4, x; Sárkeresztes BT 93/2, BT 94/4, CT 03/3, CT 04/4 x; Nagyveleg BT 84/2, BT 74/4, BT 75/4, BT 85/3 x; Mór BT 85/2, BT 84/3, BT 94/3, BT 95/3; Szápár BT 74/1; Kocsola BS 85/1, BS 86/4 - Nagykónyi BS 86/1, BS 85/4, BS 87/4 x; Kánya BS 77/1; Koppányszántó BS 76/1, BS 86/4 x; Értény BS 86/2, BS 76/3, BS 77/4, BS 87/4 x; Szakcs BS 75/1, BS 76/4, BS 85/4, BS 86/4.

Pest county catchment area: Gödöllő CT 77/1, CT 76/4, CT 86/4, CT 87/4; Gödöllő-Vácrátót CT 68/1, CT 78/4 x; Veresegyház CT 77/2, CT 67/4, CT 68/4, CT 78/3; Szokolya CU 50/2, CU 40/3, CU 41/4 x; Nagybörzsöny CU 31/1, CU 30/4, CU 40/4, CU 41/4 - Vámosmikola CU 31/1, CU 41/1 x; Bánk CU 60/2, CU 61/3.

Tisza catchment area: Hejőkeresztur DU 91/1, DU 81/4 x; Sály DU 71/2, DU 70/3, - Mezőnyárád DU 70/2, DT 79/3; Bükkábrány DU 70/1, DU 80/4; Kács DU 71/2, DU 61/3 - Tibolddaróc DU 70/1, DU 60/4, DU 61/4, DU 71/4; Fony EU 26/2, EU 16/1, EU 25/3; Rátka EU 14/2, EU 13/3, EU 23/3, EU 24/4; Mád EU 23/2, EU 13/3, EU 24/4 x; Tállya EU 14/1, EU 13/4, EU 24/4 x; Sima EU 25/2, EU 24/3 - Abaujszántó EU 14/1, EU 04/4, EU 24/4 x; Baskó EU 25/1, EU 24/4; Korlát EU 15/1, EU 16/4, EU 25/4, EU 26/4; Bogács DU 60/1; Bükkzsérc DU 61/1, DU 51/4, DU 62/4; Felsőtárkány DU 51/1, DU 52/4, DU 61/4, DU 62/4; Alsóregmec EU 46/1, EU 47/4, Rudabányácska EU 46/1; Széphalom EU 46/1 x; Pálháza EU 36/1, EU 37/4 x; Kovácsvágás EU 36/1, EU 46/4 x; Füzér EU 37/1, EU 27/4, EU 38/4 x; Füzérkajáta EU 37/1 x; Kishuta EU 36/1 x; Hollóháza EU 37/2, EU 27/3 - Kisbozsva, Nyiri EU 37/1, EU 27/1, EU 36/4; Bátor DU 41/4, Egerbakta DU 40/2, DU 41/3, DU 50/4; Kurityán DU 75/1, DU 74/4, - Alsószuha DU 65/1, DU 55/4, DU 66/4 x; Felsőkelecsény DU 75/2, DU 65/3 x; Bánhorváti DU 64/1, DU 53/4, DU 54/4, DU 63/4 x; Uppony DU 54/1, DU 53/4; Uppony-Nekézseny DU 53/1; Mályinka DU 63/1, DU 62/4; Nagyvisnyó DU 53/1, DU 52/4, DU 62/4, DU 63/4; Szilvásvárad DU 52/1, DU 53/4, DU 62/4; Hidvágardó DU 87/1, DU 88/4 - Sajóecseg DU 83/1; Martonyi DU 86/1, DU 77/4, DU 87/4 r; Alsótelekes DU 76/1 x; Szőlősardó DU 76/1 x; Jósvafő DU 67/1, DU 66/4, DU 77/4 - Szin DU 77/1 x; Szögliget DU 77/1, DU 67/4 x; Jósvafő DU 67/1, DU 66/4, DU 77/4 x; Szin DU 77/1; Szinpetri DU 77/1, DU 67/4, DU 76/4; Sajóecseg DU 83/1; Fulókércs EU 06/1, EU 16/4 - Szalaszend EU 05/2, EU 06/3, Eu 15/4, EU 16/4; Hernádpetri EU 17/2, EU 07/4, EU 16/3 - Garadna EU 16/1; Hernádvécse EU 16/1; Gönc EU 26/2, EU 16/3, EU 17/4, EU 27/3 x; Kéked EU 27/1 x; Acsa CT 79/1, CT 89/4; Váckisujfalu CT 78/1; Bercel CU 80/1, CU 70/4; Bér CU 80/1, CT 89/4, CU 90/4; Vanyarc CT 89/1, CU 80/4; Buják CU 90/1, CT 99/4, CU 80/4, CU 81/4; Hasznos DU 00/2, DU 01/3, DU 10/3; Isaszeg CT 76/2, CT 86/3 - Tápiószecső CT 95/1; Gyöngyössolymos DT 19/2, DT 29/3, DU 10/4, DU 20/4 x; Nagyréde DT 19/1, DT 08/4, DT 09/4, DT 18/4; Gyöngyöspata DT 09/1, DT 19/3, DU 00/4, DU 10/4; Mátraszentimre DU 10/1 - Gyöngyössolymos; Mátraháza DU 20/4 - Gyöngyössolymos DT 29/1; Abasár DT 29/1, DU 20/4 x; Markaz DT 29/1, DT 39/4, DU 20/4, DU 30/4 - Visonta DT 29/1, DT 28/4, DT 39/4; Abasár DT 29/1, DU 20/4 x; Mátraháza-Mátrafüred DT 29/1; Parádsasvár DU 20/1, DU 10/4 - Recsk DU 31/2, DU 20/4, DU 30/3 x; Bodony DU 21/1, DU 10/4, DU 11/4, DU 20/4 x; Mátraballa DU 21/1, DU 31/4 - Recsk r,x; Parádóhuta DU 20/2, DU 21/4, DU 30/3 x.

Astacus torrentium

Pilis Mts., Börzsöny Mts.: Nagybörzsöny CU 31/1, CU 30/4, CU 40/4, CU 41/4 x; Diósjenő CU 51/4, CU 40/4, CU 41/4, CU 50/4 - Kemence CU 42/2, CU 32/3, CU 41/1, CU 51/4 x; Csobánka CT 47/1, CT 48/4; Pilisszentkereszt CT 48/1, CT 38/4- Szentendre CT 58/2, CT 48/4, CT 57/3; Pilisszentlélek CT 38/1, CT 39/4, CT 48/4- Esztergom CT 39/2, CT 28/3, CT 29/3, CT 38/3.

B. Astacus material preserved in the Zoological Department of the Hungarian Natural History Museum

Astacus astacus

Iharosberény XM 63/1, XM 53/4, XM 54/4, XM 64/4; Baja CS 41/2, CS 31/3, CS 32/4, CS 42/3, CS 51/4; Tata, Tóváros BT 98/2, BT 97/3, CT 07/3, CT 08/3.

Astacus leptodactylus

Szeged, Tisza DS 32/2, DS 21/3, DS 22/3, DS 23/4, DS 30/4; Szolnok, Tisza DT 32/2, DT 22/4, DT 31/3, DT 33/4, DT 41/3; Siófok, Lake Balaton BS 79/2, YM 29/3, YM 20/4, BS 89/4, BT 70/3; Balatonaliga, Lake Balaton BT 80/2; Zamárdi, Lake Balaton YM 29/1, YM 19/4, YN 20/4; Akarattya, Lake Balaton BS 79/4.

Astacus torrentium

Pilisszentkereszt CT 48/1, CT 38/4.

Finally, another factor should also be mentioned here, which is of great significance in forming the recent distribution of the crayfishes. It is the introduction, of which, regrettably, very little is known. After the first occurrence and the ravages of the crayfish fungus introductions were started in 1898. Up to 1914, 1,314.000 specimens were re-introduced with state subsidy. No exact data are available, we only know that 1-2,000 specimens per kilometre were transferred. These introductions were not always successful, it is very likely, however, that the recent stock partly stems from them. Thereafter, no official introductions were made until 1939, except some private endeavours, 70 % of which was successful (THURÁNSZKY, 1960). Between 1939 and 1942 introductions were made again with subsidy, transferring 10,000 animals (2-500 specimens per stream); in spite of the small quantity these introductions produced 60 % success. In 1958-59, some 12,000 crayfishes were introduced into the waters in North Hungary. As far as we know these introductions transferred native crayfish from healthy populations to infected lakes. In September 1959 12,000 specimens of Orconectes limosus were purchased from Berlin (GDR), unfortunately, about 20 % of them perished during transportation. The living stock was transferred to three localities in the vicinity of Budapest (THURÁNSZKY, 1960). We believe that the O. limosus population, recorded in 1985 in the Danube at Budapest, is not descendant from the German specimens, but is rather the result of the expansion of the species in Europe.

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Authors' addresses: Miklós THURÁNSZKY
Belgrád rakpart 25.
H-1056 Budapest
HUNGARY

Dr. László FORRÓ
Zoological Department
Hungarian Natural History Museum
Baross u. 13.
H-1088 Budapest
HUNGARY